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## (54) PRODUCTION OF CATIONIC LATEX

### (57)Abstract:

**PURPOSE:** To obtain the titled product suitable in the fields of paper, carpet, nonwoven fabric, etc., by polymerizing a cationic monomer, an ethylenic unsaturated carboxylic acid monomer, an aliphatic conjugated diene monomer and a monoolefin monomer using a cationic emulsifier.

**CONSTITUTION:** The objective latex is produced by polymerizing 100pts.(wt.) of a monomer mixture composed of (A) preferably 0.5W20(wt)% cationic monomer [e.g. 3-(meth)acryloxy-2-hydroxypropyl-trimethylammonium chloride], (B) preferably 0.5W20% ethylenic unsaturated carboxylic acid monomer [e.g. (meth) acrylic acid], (C) preferably 1W80% aliphatic conjugated diene monomer (e.g. 1,3-butadiene) and (D) 0W98% monoolefin monomer copolymerizable therewith (e.g. styrene) using (E) preferably 0.1W10pts. of a cationic emulsifier..

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## LEGAL STATUS

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## English Translation of JP07-045526B

## \* NOTICES \*

1. This document has been translated by computer using translation software, PAT-Transer V7 produced by CROSS LANGUAGE CO. LTD. So the translation may not reflect the original precisely.
2. The word which can not be translated is expressed by Japanese character.
3. The drawings are not translated.

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## WHAT IS CLAIMED IS:

1. Production method of cationic latex, wherein cationic emulsifying agent is used in a cationic monomeric substance, an ethylene system unsaturated carboxylic acid monomeric substance, a monomeric substance pro-aliphatic conjugated diene and the monoolefin system monomer which are these and copolymerization possibility, and it polymerizes.
2. Production method of cationic latex as claimed in claims Clause 1, wherein cationic polymerization initiator is used as disclosure agent for emulsion polymerization.
3. Production method of cationic latex as claimed in claims Clause 2 that cationic polymerization initiator 0.01-5 are part by weight for 100 monomeric substance mixture part by weight.
4. Cationic emulsifying agent 0.1-10 are production method of cationic latex as claimed in claims Clause 1 that is part by weight for 100 monomer mixture part by weight comprising % by weight % by weight and monoolefin system monomer 7-98 monomer 1-80 pro-% by weight, aliphatic conjugated diene cationic monomeric substance 0.5-20 % by weight, ethylene system unsaturated carboxylic acid monomeric substance 0.5-20.
5. Claims Clause 1 or production method of cationic latex as claimed in Clause 4, wherein for cationic monomeric substance and 1 mol of a cationic emulsifying agent in total, it is used at the rate of anionic persulfate 0.002-0.04 mol as initiator for emulsion polymerization.

## DETAILED DESCRIPTION OF THE INVENTION

An a. purpose of the invention

[Industrial Application Field]

The present invention relates to production method of new cationic latex.

More particularly

New production method of cationic latex used in field such as paper, a carpet, a bonded mat, a water thinned paint, fiber disposal, engineering works erection is related to.

[Prior Art]

An aliphatic conjugated diene system monomeric substance and the cationic latex which assume an ethylene system unsaturated carboxylic acid monomer monomeric substance component are not provided.

In addition,

Manner the monomeric substance and a cationic monomeric substance, a cationic emulsifying agent are used, and to produce cationic latex is not shown.

Anionic emulsifying agent is used in a monomeric substance pro-aliphatic conjugated diene and ethylene system unsaturated carboxylic acid monomer, and polymerization is begun, cationic monomer is added in polymerization anaphase, manner to get cationic latex is known.

However,

Latex provided by this manner includes an anionic emulsifying agent, operation of a cationic monomeric substance is limited to, too, there is not despite production method of satisfied cationic latex.

Problems] which the [present invention is going to solve

When it makes cationic monomer is added in monomer mixture including a monomeric substance pro-aliphatic conjugated diene and ethylene system unsaturated carboxylic acid monomer, and do copolymerization, and cationic latex is produced, when normal anionic emulsifying agent in before is used, and it polymerizes, coagulum occurs by the end of polymerization abundantly, there were problems not to be provided satisfied latex.

As a result of people of present invention should have solved problems to take, and having studied zealously, the present invention became finish.

Configuration of b. invention

Configuration] of the [present invention

In other words production method of cationic latex including the present invention uses cationic emulsifying agent in a cationic monomeric substance, an ethylene system unsaturated carboxylic acid monomeric substance, monomer pro-aliphatic conjugated diene and the monoolefin system monomer which are these and copolymerization possibility, and polymerizing is provided.

According to the production method of the present invention, extremely cationic latex with a little building-up of polymerizing coagulum can be got.

The present invention is explained below in detail.

For a cationic monomeric substance used with the present invention, three - (meta) acryloxy -2 - hydroxypropyl trimethylammonium chloride, three - (meta) acryloxy -2 - hydroxypropyl triethylammonium chloride, three - (meta) acryloxy -2 - hydroxypropyl tributyl ammonium chloride, three - meta acryloxy -2 - hydroxypropyl dimethyl phenyl ammonium chloride, three - meta acryloxy -2 - hydroxypropyl pyridinium chloride, two - (meta) acryloxy ethyl

trimethylammonium chloride, dimethyl bamboo pipe-stem Lili -4 - vinylbenzyl ammonium chloride, allyl dimethyl dodecylammonium chloride, N,N-dimethylaminoethyl (meta) acrylate, N,N-diethylaminoethyl (meta) acrylate, N,N-dimethylaminoethyl (meta) acrylamide, N,N-diethylaminoethyl (meta) acrylamide, N,N-dimethylaminopropyl (meta) acrylamide, two-vinylpyridine are given.

A cationic monomeric substance uses together more than one kind or two kinds, and these can be used.

It is preferable for a cationic monomeric substance to use these in 0.5-20% by weight.

Gravitation becoming insufficient in face of a cationic grant of the latex which is provided when cationic monomeric substance 0.5 are less than % by weight is recognized, when 20% by weight is gone over again, coagulum tends to be easy to come to occur by the end of polymerization.

For an ethylene system unsaturated carboxylic acid monomeric substance, acrylic acid, methacrylic acid, fumaric acid, maleic acid, itaconic acid are put up.

An ethylene system unsaturated carboxylic acid monomeric substance uses together more than one kind or two kinds, and these can be used.

It is preferable for an ethylene system unsaturated carboxylic acid monomeric substance to use these in 0.5-20% by weight.

Mechanical stability of the latex which is provided when ethylene system unsaturated carboxylic acid monomeric substance 0.5 are less than % by weight tends to deteriorate, when 20% by weight is gone over again, viscosity of latex tends to rise.

For an aliphatic conjugated diene system monomeric substance, it is given 1,3-butadiene, two 1,3-carbonyl-butadiene, 1,3-two-chloro-butadiene, two 1,3-cyano-butadiene, equal が.

An aliphatic conjugated diene system monomeric substance uses together more than one kind or two kinds, and these can be used.

It is desirable that an aliphatic conjugated diene system monomeric substance uses these in 1-80% by weight.

When ability of gum is applied to the latex which is provided when monomeric substance 1 pro-aliphatic conjugated diene is less than % by weight, gravitation becoming insufficient is recognized, when 80% by weight is gone over again, coagulum tends to be easy to come to occur by the end of polymerization.

For a monoolefin system monomeric substance, an alkenyl aromatic monomeric substance, an unsaturated carboxylic acid alkyl ester monomeric substance, unsaturated monomer containing hydroxyalkyl group, cyanidation vinyl monomer, ethylene system unsaturated carboxylic acid amide monomer are given.

For an alkenyl aromatic monomeric substance, styrene, alpha methylstyrene, carbonyl alpha methylstyrene, vinyltoluene are given.

For an unsaturated carboxylic acid alkyl ester monomeric substance, methylacrylate, methyl

methacrylate, ethylacrylate, ethyl methacrylate, butylacrylate, two - ethylhexyl acrylate, glycidyl methacrylate, dimethyl Fuma rate, ジメチルマレート, ジエチルマレート, dimethyl itaconate, monomethyl Fuma rate are given.

For unsaturated monomer containing hydroxyalkyl group,  $\beta$  - hydroxy ethylacrylate,  $\beta$  - hydroxyethyl methacrylate, hydroxypropyl acrylate, hydroxypropyl methacrylate, hydroxy butylacrylate, hydroxy butylmethacrylate, three - chloro-2 - hydroxy butylmethacrylate, di- (ethylene glycol) マレート, di- (ethylene glycol) イタコネート, two - ヒドロキシエチルマレート, bis (two - hydroxyethyl) マレート, two - hydroxyethyl Fuma rate are given.

For a vinyl cyanide monomeric substance, acrylonitrile,  $\alpha$  - chloro acrylonitrile, meta acrylonitrile,  $\alpha$  - ethyl acrylonitrile are given.

For an ethylene system unsaturated carboxylic acid amide monomeric substance, acrylamide, methacrylamide, N- methylolacrylamide, N- methylol methacrylamide, N, N - dimethylacrylamide are put up.

A monoolefin system monomeric substance uses together more than one kind or two kinds, and these can be used.

It is desirable for these to use a monoolefin system monomeric substance in 7-98 % by weight.

For a cationic emulsifying agent used with the present invention, stearylamine acetate, stearylamine hydrochloride, bamboo pipe-stem Lili trimethylammonium chloride, stearyl trimethylammonium chloride, dimethyl distearyl ammonium chloride are given.

A cationic emulsifying agent uses together more than one kind or two kinds, and these can be used.

It is desirable that a cationic emulsifying agent uses these in 0.1-10 part by weight as against 100 monomeric substance mixture part by weight.

When cationic emulsifying agent 0.1 are less than part by weight, coagulum is increased during a lap, it shows a tendency, when ten part by weight is gone over again, it becomes disadvantageous economically.

For initiator for emulsion polymerization used with the present invention, polymerization initiator used for emulsion polymerization can be usually used, but the persulfate which is cationic polymerization initiator or anionic polymerization initiator especially is desirable.

For cationic polymerization initiator, 2, 2' - azobis - (amidino propane) hydrochloride, 2, 2' - azobis - (two ' - isopropyl imidazolinium hydrochloride), 2, 2' - azobis - (two - aminoethane) hydrochloride are put up.

Cationic polymerization initiator uses together more than one kind or two kinds, and these can be used.

Potassium persulfate, ammonium persulfate, sodium persulfate are nominated for persulfate.

Persulfate uses together more than one kind or two kinds, and these can be used.

In addition,

It is desirable that cationic polymerization initiator uses in 0.01–5 part by weight for 100 monomeric substance mixture part by weight.

Coagulum tends to be increased by the end of polymerization without a lap getting worse when cationic polymerization initiator 0.01 are less than part by weight when five part by weight is gone over again.

Furthermore,

What it is used as at the rate of 0.002–0.04 mol is desirable for persulfate for cationic monomeric substance and 1 mol of a cationic emulsifying agent in total.

Coagulum tends to be increased by the end of polymerization without a lap getting worse with under 0.002 mol anionic persulfate when, in addition, 0.04 mol are gone over.

There is not restriction in particular, and adjunction manner of various components in emulsion polymerization of the present invention can be used in lump addition manner, cleavage addition manner, whichever of continuous addition manner.

In addition,

Even two steps of so-called polymerization manner to change monomeric substance composition on the way and power feed polymerization manner are preferable.

Even more particularly,

If the present invention is emulsion polymerized, it is done in case, even if used electrolyte, polymerization promotor, chain transfer agent, chelating agent are usually used, it is put, and it cannot be used.

Is utilized by cationic latex provided with the present invention, depending on the application, various kinds of additive such as PH modifier, age resistor, antifoamer, antiseptic agent, thickener, filler, tackifier, blister agent can be added.

As for the latex provided with the present invention, zeta potential shows value of plus. When that is all to some extent, and PH is made alkalescence, zeta potential shows value of minus.

In addition,

Zeta potential varies with PH reversibly.

In a reason,

When latex provided with the present invention is applied to the industrial branch, it is carried conventionally, and new effect can be expected.

#### [Examples]

An example is put below up, and the present invention is explained concretely, but the present invention is not limited by these example at all.

In addition,

Department of the whole example and % mean limit all part by weight without regrets and % by weight.

#### ■ example -1

Monomer, chain transfer agent, emulsifying agent, polymerization initiator shown to 100 parts of ion-exchange water and table -1 are taught autoclave substituted for nitrogen beforehand, while stirring, it rose to 50 degrees Celsius.

Polymerization conversion ratio of a monomeric substance reached 80%, it raised temperature to 60 degrees Celsius.

Polymerization conversion ratio of a monomeric substance reached 99%, and it cools off, an unreacting monomeric substance of the whole latex is removed by stripping, latex A - I was got.

■ comparative example -1

In substitution for a cationic emulsifying agent, the sodium dodecylbenzenesulfonate which is an anionic emulsifying agent is used, with composition shown in table -1 and the number of copies, it polymerized by manner same as example -1, but a gross quantity solidified by the end of polymerization, and latex was not able to be got.

A c. effect of the invention

[advantage offered by the invention]

There is little building-up of coagulum, and cationic latex satisfying productivity, economy together is provided during a lap by using production method of the present invention.

In addition,

Cationic latex provided by means of the present invention can expect new effect satisfying reaction of potential with stability and deposition body of latex in zeta potential changing by PH reversibly together.